Sequential Targeting and Crosslinking Nanoparticles for Tackling the Multiple Barriers to Treat Brain Tumors

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ABSTRACT

Researchers at the University of California, Davis have developed an approach to improve drug delivery to tumors and metastases in the brain. Their multi-barrier tackling delivery strategy has worked to efficiently impact brain tumor management while also achieving increased survival times in anti-cancer efficacy.

FULL DESCRIPTION

While treating brain tumors, the power of therapeutics is often blocked by various drug delivery barriers in the brain. These include blood-brain tumor barriers, destabilizing effects in blood circulation, and low tumor functionality.

To combat these issues, researchers at the University of California, Davis have developed a nano-delivery approach, more specifically referred to as the "Sequential Targeting in Crosslinking" (STICK) strategy. As part of their approach, the researchers have developed two types of telodendrimers (structured building blocks that aid in drug delivery). The telodendrimers work to overcome the current problems of brain therapeutics as stated above. The STICK nanoplatform has increased loading capacity, greater micellar stability, and a multistage targeting approach. Experimentation in orthotopic (tissue transplant placed into its natural location) brain tumor models has proven the nanoplatform strategy to produce anti-cancer success with greater survival times. Extending the application to imaging and therapy, this invention also shows great potential in aiding drug delivery efficacy in brain tumors by use of image-guiding. In essence, the new approach shows promise in improving the management and overall survival rate of brain tumor patients.

APPLICATIONS

- Use in improved drug delivery approaches to treat brain tumors
- New therapeutics to combat drug delivery barriers in the brain
- Potential use in image-guided drug delivery

FEATURES/BENEFITS

- All building blocks for nano-approach (including telodendrimers) are non-toxic Increased anti-cancer efficacy with 2x survival time
- Improved management/survival of brain tumor patients
- Drug properties can be optimized for various drug types
- High efficiency in tackling physiological barriers, improving overall drug delivery process

PATENT STATUS

Country	Type	Number	Dated	Case

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OTHER INFORMATION

KEYWORDS

in vivo, drug delivery, brain tumor, brain cancer, metastases, orthotopic, nanocarriers, nanoscale, nano-delivery, multi-barriers, telodendrimers

CATEGORIZED AS

- **Materials & Chemicals**
  - Biological
  - Nanomaterials
- **Medical**
  - Delivery Systems
  - Disease: Central Nervous System
  - Imaging
  - Therapeutics

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- **Nanotechnology**
  - NanoBio
  - Tools and Devices

RELATED MATERIALS

- Sequential Targeting in Crosslinking Nanotheranostics for Tackling the Multibarriers of Brain Tumors - 02/20/2020

RELATED CASES

2020-027-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Multifunctional Porphyrin-Based Nanomedicine Platform
- PVA Nanocarrier System for Controlled Drug Delivery
- Active Nanoplatform with High Drug Loading Capacity for the Diagnosis and Treatment of Cancer
- Mitochondria Targeting Photosensitizer for Photodynamic Therapy

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